U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE
SUBCOMMITTEE ON RESEARCH

HEARING CHARTER

National Science Foundation Budget and Management Challenges

Wednesday, March 9, 2005
10:00 a.m. - Noon
2318 Rayburn House Office Building

1. Purpose

On Wednesday, March 9, 2005, the Research Subcommittee of the Committee on Science of the House of Representatives will hold a hearing to examine the fiscal year 2006 (FY06) budget request for the National Science Foundation (NSF), as well as longer-term budget and management challenges facing the Foundation.

2. Witnesses

Dr. Arden L. Bement is the Director of NSF. Prior to his appointment as NSF Director, Dr. Bement was Director of the National Institute of Standards and Technology and before that he was professor and head of the School of Nuclear Engineering at Purdue University.

Dr. Mark S. Wrighton is Chairman of the Audit and Oversight Committee of the National Science Board and the Chancellor of Washington University in St. Louis, where he also serves as professor of chemistry.

Dr. Christine C. Boesz is Inspector General of the NSF. Prior to joining NSF, she served as Head of Regulatory Accountability at Aetna U.S. Healthcare, and before that she held several government compliance and oversight positions within the Department of Health and Human Services.

3. Overarching Questions

- In developing the request, how were priorities determined across and within various agency budget accounts, programs, objectives, and priorities? If NSF were to receive additional funding in FY06 beyond the President's request, where should it be directed?

- What are the most important short-term and long-term budget and management challenges facing NSF, and how should they be addressed?

- What can NSF do to ensure that limited research and management resources are allocated most effectively?

4. Brief Overview

- NSF is the primary source of federal funding for non-medical basic research conducted at U.S. colleges and universities. In addition, NSF is the principal federal agency charged with supporting K-12 and undergraduate science, math, and engineering education, and NSF fellowships and research assistantship programs support many graduate and post-doctoral students.

- NSF funds basic research across nearly all disciplines of science and engineering. In many disciplines, such as mathematics, computer science, and the social sciences, NSF is the primary source of federal support for university researchers. Further, NSF supports research in emerging fields, such as computing and information technology since the 1960's, and nanotechnology today.

- The FY06 budget request for NSF is $5.61 billion, an increase of 2.4 percent, or $132 million over the FY05 level. However, because NSF received a 3.1 percent ($180 million) cut in FY05, the overall request level for FY06 is approximately 1 percent below the FY04 level. In addition, the increase includes a proposed transfer of $48 million from the U.S. Coast guard for ice breaking expenses in support of Antarctic research, so the increase for NSF in reality is about 1.5 percent. These flat budgets have forced NSF to make difficult decisions on priorities among its many programs and placed increasing pressure on the agency to ensure that programmatic and management resources are allocated as efficiently as possible.

- The FY06 budget request recommends major cuts to the Education and Human Resources (EHR) account. The request of $737 million for EHR is $104 million, or 12 percent, below the FY05 level and $207 million, or 22 percent, below the FY04 level. The cuts are concentrated largely on elementary and secondary education programs, and, to a lesser extent, undergraduate programs. NSF has indicated that the reductions are part of a conscious policy to significantly pare its role in program implementation, allowing work in this area to migrate to the Department of Education.

5. Background

About the National Science Foundation

NSF was created by Congress in 1950 "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense…." Roughly 200,000 people—including senior researchers, postdoctoral associates, graduate and undergraduate students, and K-12 teachers and students—are involved in NSF activities each year. NSF funds approximately 10,000 awards annually through a highly respected competitive, merit-review process. In addition to providing grants to support research projects, NSF also funds the construction and operations for major research facilities[1] (such as telescopes and ocean research vessels), supports all levels of science and engineering education, and funds programs to increase the size and proficiency of the U.S. scientific and technological workforce. Since its inception in

[1] NSF-funded major research facilities are constructed and operated by outside consortia.

1950, NSF has supported 123 of America's Nobel Prize winners, including about 50 percent of winners in Chemistry and Physics and about 60 percent of winners in Economics.

NSF is organized into directorates that support specific disciplines of science and engineering research and education: Biological Sciences; Computer and Information Science and Engineering; Geosciences; Engineering; Mathematics and Physical Sciences; Social, Behavioral and Economic Sciences; and Education and Human Resources. In addition, a number of separate offices support various specific program and management functions. (See Chart 1 for a diagram of NSF's organizational structure.)

By law, NSF leadership has two major components: a director, who oversees NSF staff and management and is responsible for program administration, merit review, planning, budget and day-to-day operations; and the 24-member National Science Board that oversees and establishes policies for the Foundation. The Board members, who are Presidentially-appointed and Senate-confirmed, are supported in part by the work of the Office of the Inspector General (OIG) of the NSF. The OIG recommends policies to promote economy, efficiency, and effectiveness in administering NSF programs and operations. The OIG reports directly to the National Science Board and to Congress.

NSF has continued to receive high marks from the Office of Management and Budget (OMB) for the quality of its management and the excellence of its programs. For example, in the FY06 budget request, NSF was one of only seven agencies that were awarded three green lights on the Executive Branch Management Scorecard. In addition, eight NSF programs were examined using OMB's Program Assessment Rating Tool (PART),[2] and all eight programs received ratings of "Effective" (the highest rating). NSF was the only agency in the Federal government to receive the highest rating on every program that underwent a PART review.

The Merit Review Process

The merit review process is a critical element of NSF activities. No research is performed at NSF by NSF employees; the Foundation's role is to solicit, select, and support the best projects proposed by the research and education communities. NSF currently receives more than 40,000 proposals per year. NSF then uses a merit review process to determine which proposals receive funding. In this process, proposals are evaluated by a panel of independent reviewers consisting of scientists, engineers and educators, who do not work at NSF or for the institution that employs the proposing researchers.[3] The reviewers assess the intellectual merit and quality of the proposed activity, taking into consideration other factors such as the impact of the work on enhancing scientific knowledge, providing educational opportunities and societal benefits, and broadening participation by underrepresented groups. The reviewers' recommendations are then passed on to NSF program officers for a final decision on whether an award should be issued.

[2] PART is described by the budget as a tool "developed to assess and improve program performance so that the Federal government can achieve better results. A PART review helps identify a program's strengths and weaknesses to inform funding and management decisions aimed at making the program more effective."

[3] NSF selects the reviewers from among the national pool of experts in each field and their evaluations are confidential. On average, about 50,000 experts give their time to serve on review panels each year.

NSF Authorization

In 2002, Congress passed, and the President signed, the *National Science Foundation Authorization Act of 2002* (P.L. 107-368). The Act authorized research and educations programs and appropriations for NSF from FY03 to FY07, and strengthened management and oversight of the Foundation. The cornerstone funding recommendation in the Act placed the overall NSF budget on a five-year doubling track, a goal that Congress and the President have fallen far short of (Table 1 includes the authorization levels set forth in P.L. 107-368).

6. Issues Facing NSF

In the current tight budget environment, NSF faces difficult challenges in determining priorities among its many programs that are deserving of increased funding. For example, NSF must determine the right balance between:

- education and research activities;
- increasing grant size and duration and supporting more scientists;
- facilities construction and operations and research;
- K-12, undergraduate, and graduate education; and
- multi-investigator, interdisciplinary projects and single-investigator research in core disciplines.

In addition to these difficult decisions regarding program priorities, budget constraints also force NSF to tackle difficult questions about allocating resources for management tasks. Below are outlined several notable programmatic and management challenges facing NSF.

Decreasing Funding for Education Programs

The programs in the NSF EHR directorate are designed to support and improve U.S. science, technology, engineering and mathematics (STEM) education at all levels and in all settings (both formal and informal).

Of the seven budget categories within the Education and Human Resources Directorate, four would receive major budget cuts in the FY06 request: Math and Science Partnerships (down 24 percent), Elementary, Secondary, and Informal Education (down 23 percent), Undergraduate Education (down 12 percent), and Research, Evaluation, and Communication (down 43 percent) (see Table 2). Most programs within these accounts are planning reductions in the number of new awards in 2006, and two – Math and Science Partnerships and Research, Evaluation, and Communication – will not make any new awards.

NSF has indicated that the reductions in elementary, secondary and undergraduate education are part of a conscious policy to significantly pare its role in program implementation, allowing these to migrate to the U.S. Department of Education. However, NSF's education programs are unique in their capacity to develop new and improved materials and assessments, create better teacher training techniques and move promising ideas from research to practice. An example of the different roles NSF and the Department of Education play can be seen in their Math and Science Partnerships (MSP) programs. The Department of Education's program awards funds to states on a formula basis and focuses primarily on secondary-level mathematics, while NSF's

program provides competitive, merit-reviewed grants to universities and school districts to explore innovative ideas and improve math and science proficiency for students of all grades. Some education policy experts have expressed concern that disinvesting in NSF K-12 education will deprive states, districts and schools of the tools and ideas they need to achieve the goals of proficiency under the *No Child Left Behind Act*.

Decreasing Success Rates for Grant Proposals

The total funding for NSF has increased significantly (approximately 40 percent) over the past six years, but the total number of proposals NSF receives has risen dramatically as well, from under 30,000 to over 44,000. This increase in proposals, coupled with a recent concerted effort to increase the size and duration of NSF grants, has led to a drop in "success rate"—the percentage of proposals that receive funding has declined from 33 percent in FY00 to an estimated 20 percent in FY05. The National Science Board has estimated that each year NSF is unable to fund 1,500 to 2,000 research proposals (about $1.5 billion worth) that receive reviewer ratings as good as those being funded.[4]

For FY06, NSF has set a goal of halting the decline in the success rate while maintaining grant size and duration.[5] Given this constraint, and the relatively flat budget requested for FY06, NSF plans to try to reduce the number of proposals it receives, in part by reducing the number of solicitations the agency issues, narrowing the areas covered in those solicitations, and requiring "pre-proposals" for some programs.[6]

NSF's efforts to reduce the number of proposals and increase the success rate are motivated by three goals: to be able to fund more of the high quality proposals they receive, to use researchers' time more effectively (putting together proposals is very time-consuming), and to reduce the administrative burden on NSF staff. However, there is some concern that narrowing the pool of proposals has the potential to lower the overall quality of the pool and hence the quality of the research NSF funds. In addition, it is not clear whether this effort will conflict with NSF's overall goal of broadening participation in NSF programs.

Funding for Major Research Equipment and Facilities Construction, Oversight, Operations, and Research

One of NSF's core missions is to provide scientists and engineers with the tools they need to perform research in a wide variety of fields. These tools range from the desktop computers and tabletop laboratory equipment used by a single researcher to scanning electron microscopes, mass spectrometers, and small supercomputers shared by multiple departments on a university campus, to large national (or international) facilities, such as radio telescopes and aircraft for environmental and atmospheric sampling.

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[4] *Fulfilling the Promise: A Report to Congress on the Budgetary and Programmatic Expansion of the National Science Foundation* (National Science Board, January 2004), page 6.

[5] The average NSF research award provides about $137,000 per year for three years.

[6] A short "pre-proposal" is designed to allow NSF to quickly evaluate the general quality and ideas within a potential proposal so that only people with a reasonably probability of success have to go through the trouble of putting together a full proposal.

In the 1990's, NSF created a special budget account for the largest facilities with the greatest cost, complexity, and scientific impact. Known as Major Research Equipment and Facilities Construction (MREFC) projects, these proposals must go through a special review and approval process—including merit review of the proposal quality, internal review by NSF scientific and financial staff, and final approval by the National Science Board—before they can be proposed to Congress for funding. While Congress has historically had concerns about the transparency and rigor of this process, it appears NSF has made significant progress recently in formalizing selection and oversight for MREFC projects (see below).

In the current budget situation, the key challenge will be determining how to appropriately balance the need to provide cutting-edge, large-scale research equipment with the need to fund research. Due to the multi-year nature of MREFC construction projects, and their long lifetime of use (usually 10-30 years), each project start is a serious commitment by NSF to provide construction, operations, maintenance, and research funding for many years to come. While the FY06 budget request does not propose any new MREFC starts, five MREFC projects are ongoing, five have been completed in the past two years, and four more have been approved by the National Science Board and are in the queue for future funding (Table 3). Setting aside support for these projects is placing increasing budget pressure on core research activities, and NSF faces a difficult and growing challenge in balancing these two needs.

Management and Oversight of the Construction and Operations of Large Research Facilities

As noted above, Congress has historically had concerns about the transparency and rigor of NSF's processes for selecting and overseeing large research facilities. For example, the relative priorities among projects—and the rationale supporting those priorities—have not always been clear. Also, clear guidelines for development, management, and oversight of large facilities, and responsibility within NSF for ensuring compliance with those guidelines—both key components of effective implementation—did not exist.

NSF is making progress in addressing these shortcomings, and four significant efforts to improve the situation are at various levels of implementation. First, NSF is now required (per P.L. 107-368) to maintain a prioritized list of pending projects that includes the criteria and rationale used in developing the rankings. Second, in 2003 NSF established the position of Deputy Director for Large Facility Projects within the NSF Office of Budget, Finance and Award Management. Third is the development of a "Major Facilities Guide" to outline a process for NSF's management and oversight of proposal, construction, and operations of large facilities projects and of a document describing the process for "Setting Priorities for Large Research Facility Projects Supported by the National Science Foundation." Both of these documents have been drafted and are scheduled to be finalized by the NSF and the National Science Board this summer. Fourth, NSF has hired a contractor to develop an automated central cost-tracking system specifically to enable full cost accounting for large facilities projects; the basic elements of this system are expected be in place in September 2005, with the full system becoming operational in 2006.

These are all important steps that bear careful watching going forward. Of particular concern is how NSF will provide the Deputy Director for Large Facility Projects with the resources and authorities needed to carry out his oversight responsibilities. Each large facility project has program management staff within the research directorate that spawned the project, but the Deputy Director for Large Facility Projects is responsible for overseeing all of the projects. The completion of the central cost-accounting system should certainly provide the Deputy's office with a valuable tool, but support staff will also be needed to help gather and maintain information on, and assess the scientific progress and financial performance of, large facility projects.[7] Finally, the role that the Deputy will play in certifying to the National Science Board projects' readiness to begin construction and monitoring projects' progress is still to be finalized and implemented.

Workforce Planning

The Office of Inspector General (OIG) has identified workforce planning as one of the most serious management challenges facing NSF. The effectiveness of NSF's current workforce of 1,700 permanent staff, visiting personnel, and contract employees has been increasingly hampered by rapidly growing workloads and limited space. For example, since 1999, the agency has seen a 40 percent increase in the number of proposals received each year, including a 14 percent increase last year alone. As a result, NSF estimates that program officers now spend 55 percent of their time reviewing proposals, leaving less time for other duties such as award oversight and program planning.

While the OIG reports that recent steps taken by NSF to lease additional office space and add full-time employees has alleviated some of these pressures, a longer-term solution is still needed. NSF asserts that its comprehensive, multi-year project reviewing internal business processes (known as the "*Business Analysis"*), which is scheduled for completion by the end of FY05, will provide a long-term plan for identifying and addressing workforce needs.

Icebreaking Services for NSF Facilities at the South Pole

The NSF manages three year-round facilities in Antarctica, where research in physics, astronomy, ocean science, climate science, marine and land ecosystems, and other fields is performed. To access these facilities for resupply missions, NSF uses two large ice breaking ships owned and operated by the U.S. Coast Guard (USCG). NSF reimburses the USCG for the incremental costs associated with this use. While there are other needs for these ships (such as military preparedness, law enforcement, and USCG training), over the past three years, support of NSF science activities has accounted for roughly 90 percent of the ships' time. Therefore, in the FY06 budget request, the Administration proposes shifting the base funding for the two polar class ice breakers, as well as another ship,[8] from the USCG to NSF.

Much of the information needed to evaluate the appropriateness of transferring the responsibility and funding for the ice breakers from USCG to NSF remains elusive. In the short term, the actual costs of operations and maintenance for these ships has not been determined, and it is

[7] Currently, the support staff for the Deputy Director for Large Facility Projects is only 1.5 full-time equivalents.
[8] The third ship is the Healy, a research vessel with ice breaking capabilities that operates mainly in the Arctic.

unclear if the transferred $48 million will be sufficient. In the longer term, Congress and the Administration must consider how best to replace the current polar class ice-breaking ships, which are nearing the end of their useful lives. It is not immediately clear which agencies should bear the costs and be responsible for refurbishment or replacement of the existing ships. NSF and USCG, along with the Office of Science and Technology Policy and the Office of Management and Budget, are engaged in deliberations on these questions.

Post-Award Administration

For the third consecutive year, independent audits of NSF's financial statements have identified post-award monitoring of grantee institutions as a "reportable condition." The OIG reports that effective post-award monitoring should ensure that: "awardees are complying with award terms and conditions and federal regulations; adequate progress is being made toward achieving the objectives and milestones of the program; and expenditures listed on NSF's financial statements are accurate."[9]

In response, NSF has taken steps to address some of the post-award monitoring issues identified through the independent audits, such as establishing a risk-based program for identifying and tracking high-risk awardees. The Foundation has also noted that the expensive nature of site visits associated with post-award monitoring, coupled with limited administrative and personnel resources, have hindered its ability to address many of these issues. While noting that progress has occurred, and recognizing budget limitations, the OIG has (1) emphasized that NSF's measures have been too narrowly focused on "high-risk awardees," which constitute less than 0.1 percent of NSF's award portfolio; and (2) recommended that NSF "apply more cost-effective monitoring procedures such as desk reviews of reports from awardees and computer-assisted screening to medium and low-risk awardees on a random basis."

7. Witness Questions

The witnesses were asked to address the following questions in their testimony:

Questions for Dr. Arden Bement

- In developing the request, how were priorities determined across budget accounts (research, education, facilities, and administration), within accounts (i.e. K-12, undergraduate, and graduate education; research directorates and divisions), and among related agency objectives and priorities (i.e., success rate, grant size and duration; multi- and single-investigator research; facilities construction, operation, and research)? If NSF were to receive additional funding in FY06 beyond the President's request, where should it be directed?
- What are the most important short-term and long-term budget and management challenges facing NSF and how is the agency working to address them?
- The FY06 budget request includes a goal to halt this precipitous decline in the success rate while maintaining recent gains NSF has made in expanding the average size and duration of its grants. What strategies will NSF employ to achieve this? How will NSF ensure that

[9] NSF Office of the Inspector General's Semiannual Report to Congress (September 2004), page 52.

efforts to reduce the number of proposals does not conflict with efforts to broaden participation in NSF programs? To what extent would a strategy of narrowing the pool of proposals lower the overall quality of the pool and hence the quality of the research NSF funds?

- As an increasing number of Major Research Equipment and Facilities Construction (MREFC) projects transition out of the construction phase and into operation, how will NSF balance the need to support core activities in its research accounts with the need to fully fund the operations and research costs associated with new facilities?
- Within NSF's Education and Human Resources (EHR) directorate, the Division of Research, Evaluation, and Communication receives a proposed cut of 43 percent from the FY05 enacted level and will propose no new awards. Is it NSF's goal to provide funding for new awards in FY07 and beyond, or does the fact that no new awards will be made in FY06 signal a planned phase-out of this division?
- What actions is NSF taking to address the management and performance issues outlined in the Office of Inspector General's (OIG) FY05 "Management Challenges" letter, particularly those related to workforce planning, post-award administration, and large facilities projects?

Questions for Dr. Mark Wrighton

- If NSF were to receive additional funding in FY06 beyond the President's request, where should it be directed?
- What are the most important short-term and long-term budget and management challenges facing NSF and how is the National Science Board (NSB) working to address them? Please provide a summary of recent policy actions that the Board has taken, and a summary of other current issues that are under consideration.
- How is the NSB working with NSF to address the management and performance issues outlined in the Office of Inspector General's (OIG) FY05 "Management Challenges" letter, particularly those related to workforce planning, post-award administration, and large facilities projects?

Questions for Dr. Tina Boesz

- Please provide an overview of NSF Inspector General (IG) responsibilities and activities, and a summary of recent IG actions and reports.
- What are the most important short-term and long-term budget and management challenges facing NSF, and what actions should NSF be taking to address those challenges? In particular, please discuss the issues related to workforce planning, post-award administration, and large facilities planning.

Chart 1.

National Science Foundation (NSF)

Organization Chart

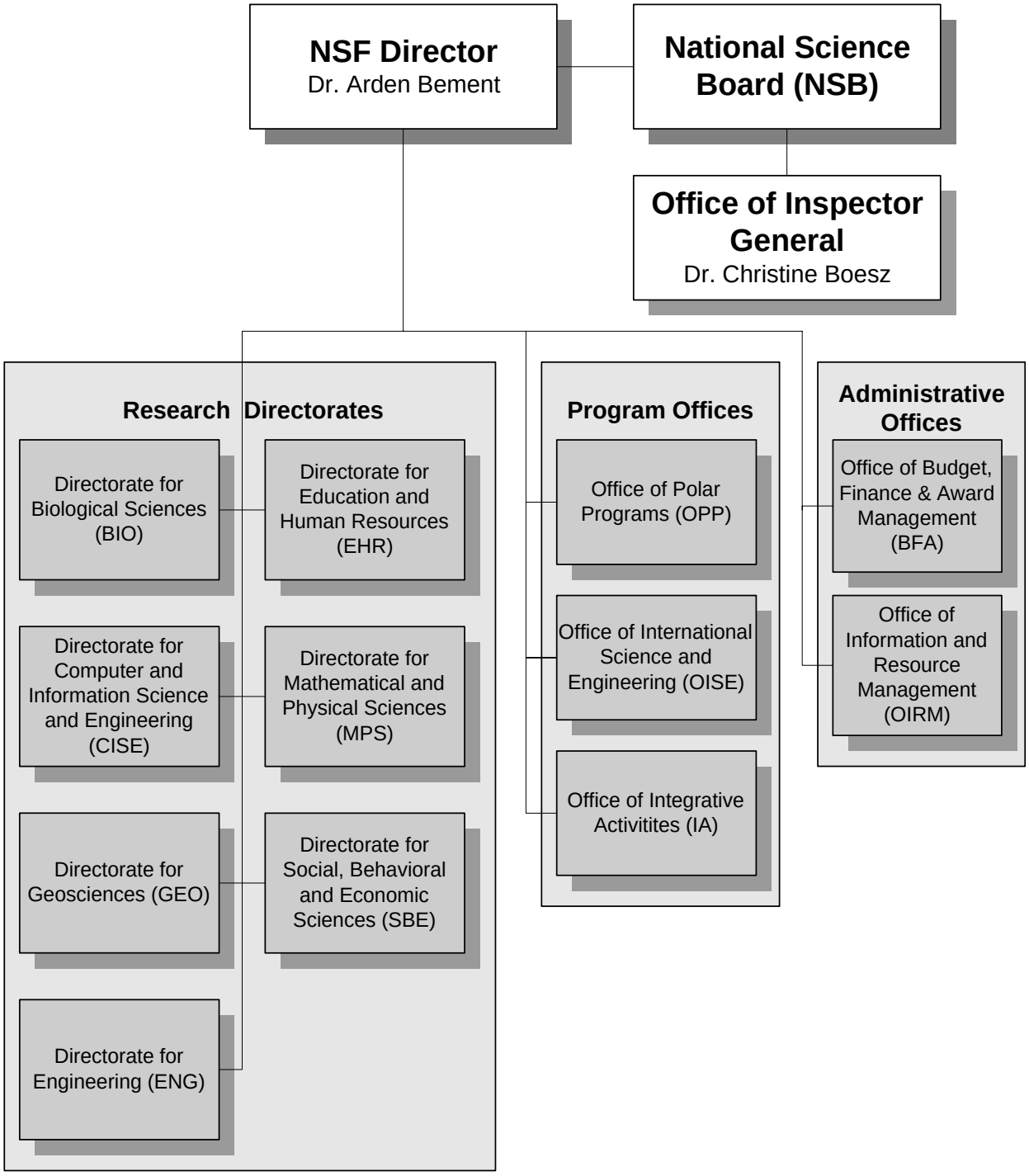

Table 1.

National Science Foundation
FY 2005 Budget Request (dollars in millions)
(Source: Agency Budget Justification)

Account	FY04 Actual	FY05 Current Plan	FY06 Request	Change FY05 to FY06		Authorized Levels	
				Amount	Percent	FY05	FY06[1]
RRA	4293	4221	4333	113	2.7%	5544	--
BIO	587	577	582	5	0.9%	--	--
CISE	605	614	621	7	1.1%	--	--
ENG	566	561	581	19	3.5%	--	--
GEO	713	694	709	15	2.2%	--	--
MPS	1092	1070	1086	16	1.5%	--	--
SBE	184	197	199	2	1.0%	--	--
OISE	41	34	35	1	2.3%	--	--
OPP	342	344	387	43	12.4%[10]	--	--
IA	164	130	135	5	3.8%	--	--
EHR	944	841	737	-104	-12.4%	1331	--
MREFC	184	174	250	76	44.0%	259	--
S&E	219	223	269	46	20.5%	231	--
OIG	9	10	12	1	14.7%	9	--
NSB	2	4	4	0	0.8%	4	--
Total	**5652**	**5473**	**5605**	**132**	**2.4%**	**7378**	**8520**

[1] The National Science Foundation Act of 2002 did not authorize funding for specific budget accounts in FY06.

Acronyms:

RRA = Research and Related Activities

EHR = Education and Human Resources

MREFC = Major Research Equipment and Facilities Construction

S&E = Salaries & Expenses

OIG = Office of Inspector General

NSB = National Science Board

BIO = Biological Sciences

CISE = Computer & Information Science & Engineering

ENG = Engineering

GEO = Geosciences

MPS = Mathematical and Physical Sciences

SBE = Social, Behavioral, and Economic Sciences

OISE = Office of International Science and Engineering

OPP = Office of Polar Programs

IA = Integrative Activities

[10] Includes $48 million transfer from the Coast Guard for ice-breaking activities.

Table 2.

NSF Education and Human Resources Directorate

FY 2006 Budget Request (dollars in millions)

(Source: Agency budget justification)

Account	FY04 Actual	FY05 Current Plan	FY06 Request	Change FY05-06 $	Change FY05-06 %
EISE	206	182	141	-41.2	-23 %
IMD	29	29	19	-9.6	-33 %
TPC	62	60	33	-27.2	-45 %
CLT	27	26	22	-4.5	-17 %
MSP	139	79	60	-19.4	-24 %
Undergrad	163	154	135	-18.7	-12 %
SfS	16	14	10	-4.1	-29 %
CCLI	40	46	31	-9.6	-23 %
Graduate	155	155	155	0.3	0.2 %
HRD	120	119	119	-0.1	-0.1 %
CREST	14.9	15.9	18.5	2.6	16 %
MIE	2.5	2.5	0	-2.5	-100%
EPSCOR	94.2	94	94	0.3	0.3 %
REC	66.4	59	33.8	-25.7	-43 %
TOTAL	**944**	**841**	**737**	**-104**	**-12 %**

*Not a complete list of education programs.

Acronyms:
EISE – Elementary, Secondary and Informal Education
IMD – Instructional Materials Development
TPC – Teacher Professional Continuum
CLT – Centers for Learning and Teaching
SfS – Scholarship for Service
CCLI – Course, Curriculum and Laboratory Improvement
MSP – Math and Science Partnership Program
HRD – Human Resource Development
CREST – Centers for Research Excellence in Science and Technology
MIE – Model Institutions for Excellence
EPSCoR – Experimental Program to Stimulate Competitive Research
REC – Research, Evaluation and Communication

Table 3.

NSF Major Research Equipment and Facilities Construction Account FY 2006 Budget Request (dollars in Millions) Source: Agency budget justification						
	FY04 Actual	FY05 Current Plan*	FY06 Request	FY07 Estimate	FY08 Estimate	FY09 Estimate
Ongoing and Recently Completed Projects						
ALMA	50.7	49.3	49.2	47.9	46.5	37.4
EarthScope	43.2	47.0	50.6	26.8		
HIAPER	12.5					
Ice Cube	38.4	47.6	50.5	28.7	21.8	11.3
LHC (completed in FY03)						
NEON				12.0	12.0	20.0
NEES	8.1					
RSVP		14.9	41.8	48.0	30.8	15.0
SODV		14.9	57.9	42.2		
South Pole Station	21.0					
Terascale Computing Systems	10.1					
Projects Approved as Future Starts						
Ocean Observatories Initiative				13.5	42.0	65.5
Alaska Region Research Vessel				49.3	32.9	
Advanced LIGO					28.5	42.81
Total	**$184.0**	**$173.7**	**$250.0**	**$268.4**	**$214.4**	**$192.0**

Totals may not add due to rounding.

*The FY 2005 total includes $37.13 million carried forward from previous years. This includes $29.87 million for the South Pole Station Modernization project, $115,000 for Polar Support Aircraft upgrades, $34,418 for the South Pole Safety project, and $7.11 million for IceCube.

Acronyms and Project Information:

ALMA (Atacama Large Millimeter Array) – a large radio telescope to look at the evolution of the universe.

EarthScope – a geosciences project to put sensors on earthquake faults and at sites across the U.S.

HIAPER (High-performance Instrumented Airborne Platform for Experimental Research) – an aircraft to take environmental and atmospheric measurements at high altitudes.

Ice Cube – an array of sensors under the ice at the South Pole to observe neutrinos for astronomy research.

LHC (Large Hadron Collider) – detectors at LHC to study fundamental laws of particle physics.

NEON (National Ecological Observatory Network) – a U.S.-wide array of stations to study environmental systems.

NEES (Network for Earthquake Engineering Simulation) – a collection of facilities to model earthquake-related effects.

RSVP (Rare Symmetry Violating Processes) – detectors to study fundamental laws of particle physics.

SODV (Scientific Ocean Drilling Vessel) – a deep-sea drilling vessel for environmental and ocean research.

South Pole Station – renovation of the NSF facility in Antarctica.

Terascale Computing Systems – a large, distributed supercomputing network.

Ocean Observatories Initiative – a distributed array of sensors to gather data on conditions throughout the world's oceans.

Alaska Region Research Vessel – a new vessel to study climate and ecosystems issues in the Arctic.

Advanced LIGO (Laser Interferometer Gravitational Wave Observatory) – phase 2 of an astronomy experiment on the structure of the universe.